



Food Safety Modernization Act: The Case for Complementary Public Regulation and Private Standards

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PRESIDENT OBAMA signed into law the Food and Drug Administration (FDA) *Food Safety Modernization Act of 2010* (FSMA) in January 2011. FSMA is a set of regulations that modifies U.S. food safety laws and extends their scope. FSMA is considered to be the first major reform of U.S. food safety laws since 1938. FSMA specifically targets products that are under the jurisdiction of FDA and thus impacts products such as produce, dairy, seafood, fresh eggs and eggs used as ingredients. The stated objective of FSMA is to shift the focus from response to food contamination to prevention.

Since the adoption of the law, the FDA has been preparing rules for the execution of FSMA. The implementation of FSMA is done through seven rules: (1) standards for produce safety; (2) preventive controls for human food; (3) preventive controls for food for animals; (4) a foreign supplier verification program; (5) accreditation of third-party auditors; (6) sanitary transportation of human and animal food; and (7) food protection against intentional adulteration. We focus in this short piece on the rulemaking process for **produce safety** when FSMA rules overlap with existing private industry standards.

The Leafy-Greens Marketing Agreements (LGMA) in California

and Arizona provide an example of an industry initiative to develop private standards to control food safety hazards in produce. In response to the 2006 *E.coli* outbreak that prompted a nationwide recall of all fresh spinach, the California and Arizona leafy green products handler marketing associations adopted LGMA in 2007. LGMA covers 14 produce commodities and includes provisions regarding the environment, water, soil amendments, worker practices, and field sanitation. LGMA members handle, process, ship or distribute leafy green, although they do not necessarily produce leafy green themselves. However, LGMA handlers agreed to purchase leafy greens only from growers who meet the standards defined by LGMA. The stated objective of the agreement is to protect public health by reducing the risk of foodborne illnesses and outbreaks linked to leafy greens by implementing food safety practices during production and harvesting.

The produce safety rules under FSMA of course overlap with LGMA standards. However, the rulemaking process in the U.S. makes it possible to limit the burden of FSMA on producers that are already complying with equivalent or stricter LGMA standards. FDA first issued proposed rules for produce safety on January 16, 2013 and then sought input from stakeholders through public meetings



Scientists at the ARS Produce Quality and Safety Laboratory in Beltsville, Maryland, are focusing on ways to keep packaged fresh-cut lettuce and leafy greens safe. (Photo by Keith Weller.)


and other outreach activities. FDA also accepted comments on the proposed rules until November 22, 2013. FDA received more than 37,000 comments on the proposed produce safety rule. In response to the comments, FDA released supplemental proposed rule on September 29, 2014. Comments on the supplemental rule are due on December 15, 2014. (Note: The proposed rule and the supplemental proposed rule are posted under the )

Table 1. Proposed FDA Microbial Water Testing (generic *E. coli*) Rule

LGMA	FSMA proposed rule	FSMA supplemental proposed rule
<ul style="list-style-type: none"> • Test all water source prior use if more than 60 days since last test of the water source • Test must be collected monthly during use • For wells and municipal water if generic <i>E.coli</i> are below detection limits for five consecutive samples sampling frequency may decrease to once every 180 days • Water can be used for irrigation only if test show less than 126 CFU/100ml over a rolling geometric mean of 5 samples or less than 235 CFU/100ml on a single sample 	<ul style="list-style-type: none"> • Test untreated surface water every 7 days • Test untreated ground water every 3 months • Geometric mean not to exceed 126 CFU/100ml • Upper limit on a single water sample of 235 CFU/100ml 	<ul style="list-style-type: none"> • For untreated surface water, baseline survey of a minimum of 20 samples during growing season. The baseline determines if water meets the microbial quality standard. If baseline shows that water is of good quality, then a minimum of five samples per year are required • For untreated ground water, at least four tests during a growing season. Then if water meets the quality standard, testing can be done once annually • Geometric mean not to exceed 126 CFU/100ml and a statistical threshold value not to exceed 410 CFU/100ml • If water does not meet quality standard, irrigation is allowed provided a die-off rate of 0.5 log per day between the last irrigation and harvest

same docket. Comments and other documents on the proposed rule and the supplemental proposed rule for produce safety are available at www.regulations.gov/#!docketDetail;D=FDA-2011-N-0921.)

There are many factors that may vary among producers in terms of location, the product category, the production method (e.g., organic vs. conventional) and scale of operation. The challenge for FSMA is to maintain the science-based design of the rule-making, yet support alignment with industry guidance in implementation. As the table above shows, there were extensive changes made to the water testing provisions for produce safety in response to comments to the proposed rule. This

is also true for other provisions. If the modifications to the rule are not done at the expense of weaker standards, they are then likely to improve the economics of the rulemaking process.

The success of either the publicly mandated rules or private standards depends on whether the required practice is effective at reducing the foodborne hazard. Furthermore, the success also depends on whether adopting the practice is cost effective relative to other methods and practices. These questions are very challenging to address in the natural environment of produce production. The data requirements are extensive for a controlled experiment to the extent that FDA has little information on the cost impact of specific produce rules. The

information gap is even greater when it comes to evaluating the benefits of the food safety interventions through a reduction in foodborne illnesses. A recent study by Jensen et al. (2013) shows how one might use data available from field studies and available cost information to assess the cost effectiveness of water testing. This is a first stage to developing multiple comparisons of effectiveness of all interventions relative to cost in initiatives such as FSMA and LGMA. A more systematic evaluation of the costs and benefit of farm-level regulation in produce can help to identify the best strategies for implementing food safety legislation.

Reference

Jensen, H.H., S. Pouliot, T. Wang, and M.T. Jay-Russell. 2014. "Development of a Cost Effectiveness Analysis of Leafy Green Marketing Agreement Irrigation Water Provisions." *Journal of Food Protection* 77: 1038–1042. ■

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Weather Adjusted Yield Trends for Corn: A Look at Iowa

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YIELD GROWTH in agricultural crops is of importance to those who make long-term projections of food availability and price levels. Menz and Pardey (1983) found that the trend growth in corn yields was lower in the 1970s than in the previous two decades. Tannura, Irwin, and Scott (2008) cited a number of crop experts and seed companies who believe that improved technology, particularly biotechnology, will increase the rate of yield growth in corn. Yu and Babcock (2010) found that percentage losses due to drought have been reduced over time, offsetting one of the major impediments to stronger yield growth. However, other researchers have argued that climate change will slow or even reverse the rate of yield growth (World Bank 2013).

The purpose of this report is to measure and present weather-adjusted trend yields for corn in Iowa. We use goodness-of-fit criteria to guide the choice of explanatory variables and the functional form of the relationship between yield and weather.

Our model controls for three key weather factors: rainfall, temperature, and the Palmer Drought Severity Index (PDSI). The PDSI is a long-term cumulative measure of water availability in the soil. The PDSI is negative if the soil is dry and positive when there is ample or surplus water. We control for linear and non-linear impacts of these variables and for interaction terms among them. Finally, we include a variable to measure the impact of heat stress. This is represented by the number of days when the temperature exceeded a certain critical value and is allowed to vary in each part of the state.

Data

Corn yield and weather data for all 99 counties in Iowa are sourced from the National Agriculture Statistics Service (NASS) for the years 1950–2012. County-level daily temperature data for each

July was collected from the National Oceanic and Atmospheric Administration (NOAA). The temperature data includes daily maximum temperature (TMAX). The number of days that maximum temperature exceeds each critical value ➡

Figure 1. Iowa Crop Reporting District (CRD) Map and Average Corn Suitability Ratings

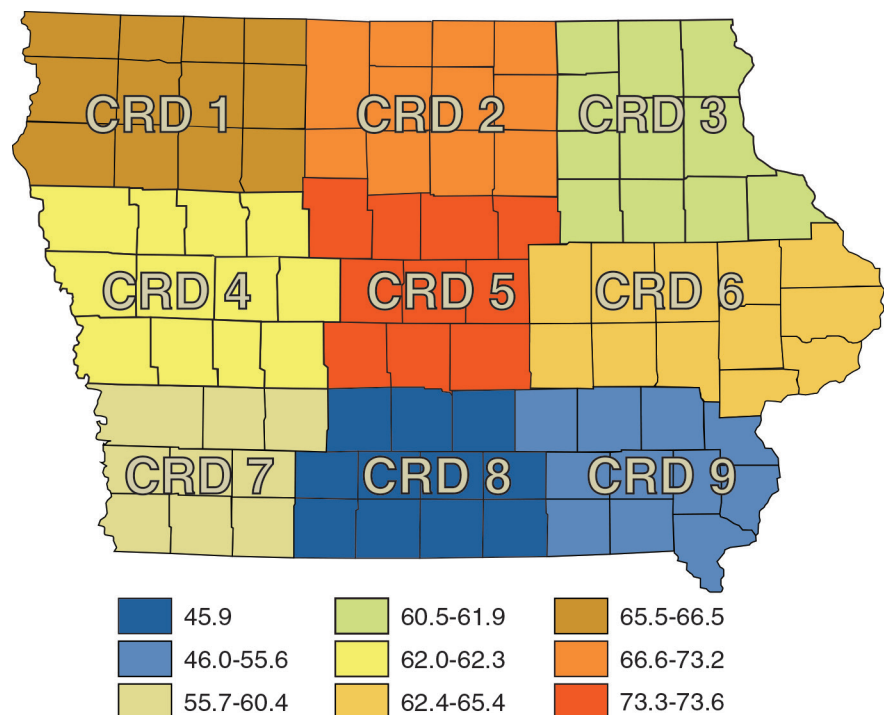
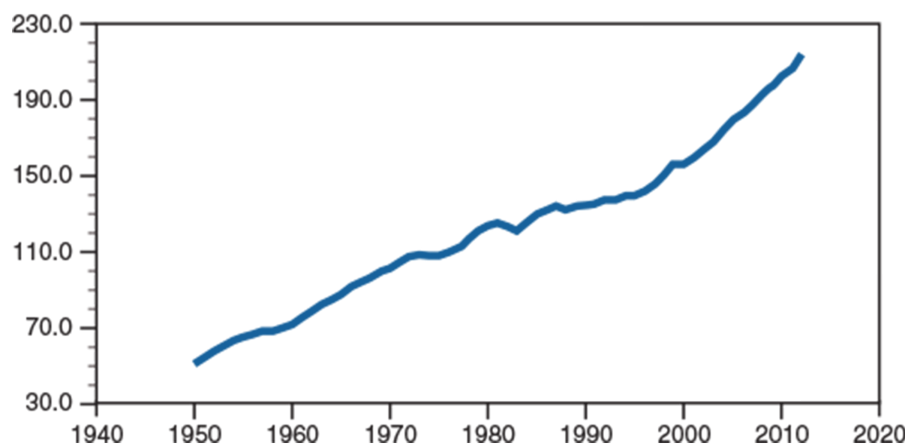


Figure 2. Statewide Results
Bushels per acre



is calculated from this daily temperature data. All the counties in the state of Iowa are matched with at least one weather station. For the counties with multiple stations, we use the average weather data for all stations included in the county. Where data is missing for one county in one year we use the weather data collected from neighboring counties.

The Palmer Drought Severity Index (PDSI) is available from NOAA at the Crop Reporting District (CRD) level. The 99 counties in Iowa are divided into nine CRDs. County-level total monthly precipitation (TPCP) data was also collected from NOAA. Total monthly rainfall for the period April to August is used to estimate the effect of rainfall on corn yield.

In order to prevent county-level anomalies as well as overly long tables, results presented here are for each of Iowa's nine crop reporting districts. The county-level results are very similar and available on request. The map of the CRDs in Iowa is presented in Figure 1. This figure also provides a measure of the suitability of the soils in each CRD to grow corn. CRDs 1, 2, 4, 5, and 6 have the higher quality soils for corn production, while CRDs 3, 7, 8, and 9 contain lower quality soils.

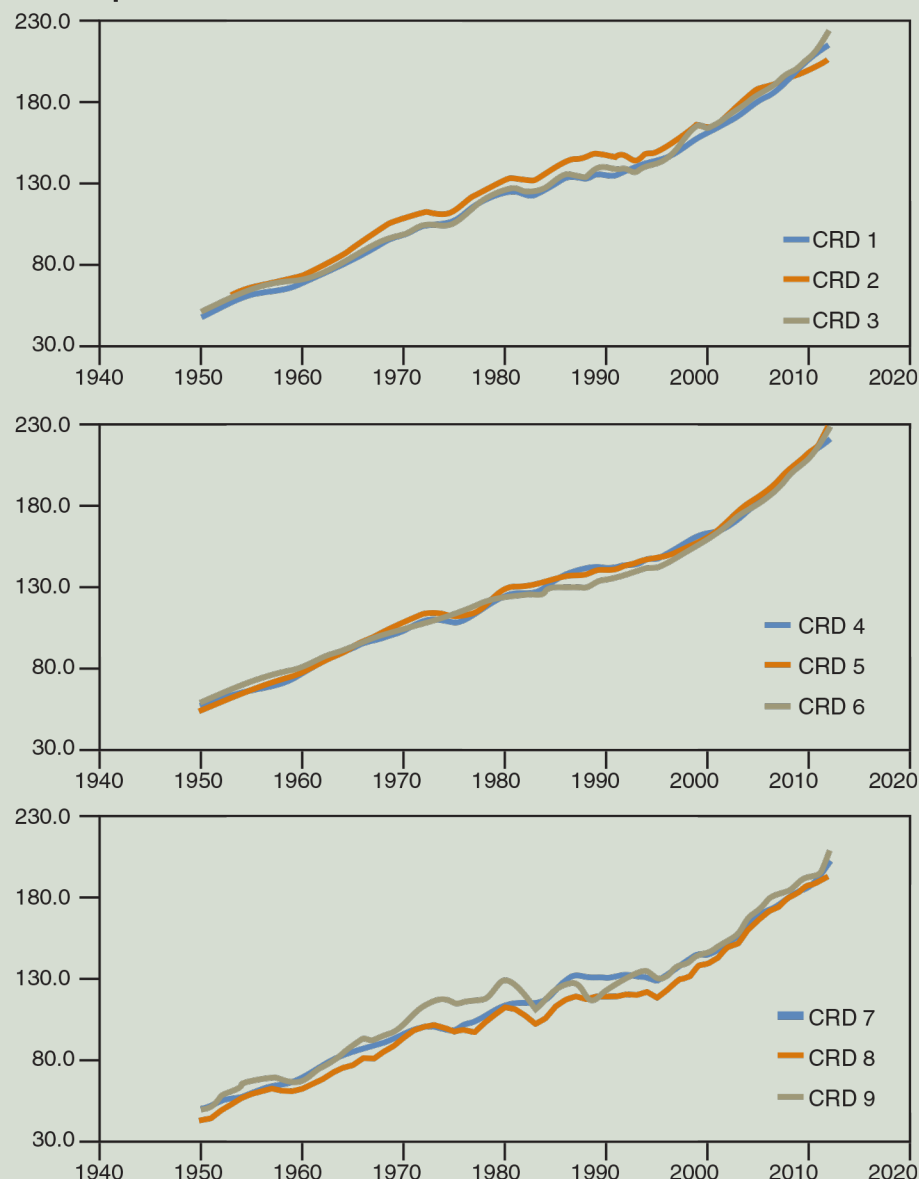
Results

Statewide results are shown in Figure 2. This shows that yield growth plateaued in the mid-1980s and then began to increase rapidly in the mid-1990s. The timing of the yield growth surge is consistent with, but does not prove, that insect resistant corn varieties, first commercialized in the mid-1990s, helped improve yields.

An example of this crop innovation is the corn-rootworm-resistant biotech trait (CRW), introduced in 2003. This technology has been widely adopted. It had a 20 percent market share in 2005 and a 50 percent share in 2011 (Marra, Piggott, and Goodwin 2012). This trait resulted in healthier, larger root systems

Figure 3. CRD Level Results

Bushels per acre



and had a significant yield impact in dryer areas that had been impacted by the pest. Rootworm problems were widespread in Iowa prior to the introduction of the trait (Marra, Piggott, and Goodwin 2012).

Figure 3 shows the regional trends in yield growth. These results show a consistent pattern across the regions in Iowa.

The yield growth we show here is due to genetic gain. Other variables such as disease, wind, management, and weather

impacts are not included in the trend estimates. In the exploration for the final model structure, our initial explanation for cross-CRD yield patterns was that there might be some excluded weather terms that explain patterns across the CRDs. We explored the possibility that an increase in excessively hot days occurred in the poorly performing regions, but this was not borne out by the results. We also examined whether there was an increase in the number of rain events with more than two inches of rain in one event.

Crop Insurance in Iowa

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FARMERS ACROSS the nation rely heavily on crop insurance as a risk management tool—in Iowa alone over 93 percent of corn and soybean planted area was insured in 2014, but that participation rate hasn't always been the case. Participation in crop insurance declined substantially in the early 1990s after the mandate that required producers to purchase crop insurance in 1989 and 1990 to collect drought assistance in 1988 dissipated.

The fast recovery in 1994–1995 reflects the impact of higher effective subsidies rates and the requirement to obtain coverage in order to receive federal benefits instituted by the Federal Crop Insurance Reform Act of 1994. The 1996 Farm Bill repealed mandatory enrollment to receive federal benefits, but tied enrollment in crop insurance programs to disaster assistance instead. This resulted in a substantial drop in crop insurance participation between 1995 and 1997.

Despite another dip in effective subsidy rates between 1998 and 2000 as a result of changes in selected coverage levels, the percentage of planted acres participating in crop insurance has been trending upward since 1997 for both corn and soybeans.



USDA-ARS

The Agricultural Risk Protection Act of 2000 codified into law previously introduced ad hoc premium reductions (offered late in the signup period for 1998 and 1999) with a heavy focus on subsidizing more insurance plans with higher levels of coverage (O'Donoghue 2014).

Dominance of Revenue Products

Over the years, the menu of crop insurance policies expanded substantially by incorporating revenue

and area based products as well as more coverage levels. In order to simplify the analysis of participation decisions, we have classified all crop insurance programs into one of the following categories: farm catastrophic plans, farm yield buy-up plans, farm revenue buy-up plans, and county plans. Farm catastrophic (CAT) plans include the catastrophic options of Actual Production History (APH) and Yield Protection (YP) (the Group Risk Plan catastrophic plan is included under area plans in this analysis). Farm yield buy-up plans include those policies above the minimal, fully subsidized catastrophic coverage available to farmers from APH and YP. Farm revenue buy-up plans include Crop Revenue Coverage, Income Protection, Revenue Assurance, Revenue Protection, and Revenue Protection with Harvest Price Exclusion. County plans include both catastrophic and buy-up plans for yield and revenue coverage plans based on county data: Group Risk Income Protection, Group Risk Income Protection with Harvest Revenue Option, Group Risk Plan, Area Risk Protection, Area Risk Protection with Harvest Price Exclusion, and Area Yield Protection.

The evolution of the four insurance categories between 1989 and 2014

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Again, there was no statistically valid relationship. Our results indicate that there is some support for a higher yield growth rate in the northwest part of the state. This is the driest area in the state and therefore the corn rootworm trait may have been particularly beneficial.

The variable measuring the impact of extreme temperatures was not significant for CRDs 1, 2, and 4. However, critical temperature did emerge for other areas of the state. The critical temperature was 94 degrees for CRD 5, 95 degrees for CRD 6, 92 degrees for CRD 3, 93 degrees for CRD 9 and 90 degrees for CRDs 7 and 8. These results indicate

that the parts of the state with the highest CSR are best able to handle heat stress. One intuitive explanation is that corn growing on high quality soils may be able to resist high temperatures because the corn root system can source more water than in less productive soils. ■

Strong Demand, but Inconsistent Profitability

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WITH THE arrival of fall, the leaves change, the temperatures drop, and agricultural producers prepare for the winter ahead. This winter looks to be a reversal of fortunes across the agricultural complex. Over the past few years, crop producers have enjoyed record prices and profits, while livestock producers have suffered from high feed costs and negative returns. Now, several sectors of the livestock industry are looking forward to strong prices and good profitability. Meanwhile, the crop sector is staring at the lowest returns in several years. While there are some key differences in the structure of crop and livestock markets, the one similarity they share right now is strong demand for agricultural products.

Throughout 2014, the livestock industry, and especially the meat packing sector, has been concerned about the willingness of customers to accept higher prices for meat products. In both the cattle and hog markets, packers have been trying to hold the line on prices and reducing numbers to limit total costs. As we look at 3rd quarter demand from the packers, cattle demand is flat as prices have risen just enough to offset the reduction in consumption. Hog demand has declined over the past year as the price increase was not large enough to compensate for the consumption drop.

However, 3rd quarter demand from the retail meat sector paints a different picture. Customers have continued to walk up to the meat counter and are spending more on meat products than they were last year. For fresh beef, consumption is down nearly 5 percent on a year-to-year basis; however, with a roughly 15 percent increase in beef prices over the past year, beef demand continues to rise. It is a very similar story for pork—consumption is down slightly, but given a 10 percent price increase, pork demand is growing. So while the industry has been, and continues, worrying about a price backlash, consumers have shown that their meat demand is quite resilient.

The crop sector, on the other hand, does not have to worry about prices driving away consumers. Compared to a couple of years ago, crop prices have fallen dramatically. Corn prices are roughly half of their 2012 values. Soybean prices are hovering in the \$10 range, after being in the high-teens for 2012. Total corn and soybean demand hit record levels for the 2013 crops. Projections for the 2014 crops show that demand is expected to grow.

Looking back at the strong demand for last year's crops, the surge in demand came on a number of fronts.

Feed and residual demand was much stronger in the first half of the year, compared to previous years. Expansion in the pork and poultry industries helped that cause. Corn usage via ethanol steadily climbed throughout the year as ethanol was cost-competitive in the fuel market; and international demand via exports also rallied throughout the year as the livestock sectors in other countries expanded as well. For soybeans, domestic usage was stable. It was on the export side that we experienced additional gains in demand. China is the dominant player here. Roughly 60 percent of all U.S. soybean exports are shipped to China. Continued growth in their market is key for a recovery in soybean prices.

The demand projections for the crops currently being harvested indicate growth in demand in several areas. The pork and poultry expansions are expected to extend through 2015, implying more feed demand in the coming year. That bodes well for both corn and soybeans. Ethanol production is forecast to stabilize, leaving corn usage for ethanol near record levels. Corn sweetener demand is set to consume an additional 30 million bushels. Soybean exports are expected to top last year's record levels. The one projected weak area in corn demand at the moment is export demand. USDA is projecting a 167 million bushel drop in corn exports, based on larger world supplies.

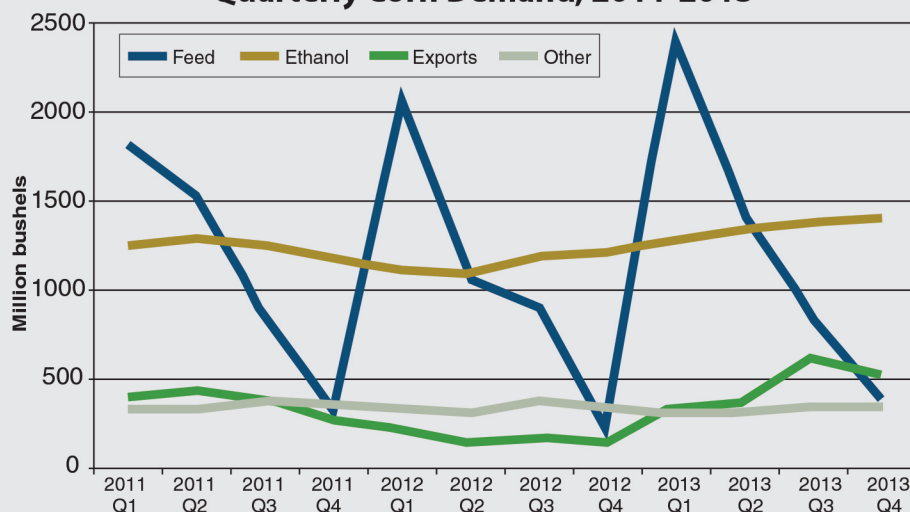
So while both the crop and livestock sectors have very strong (and in the crops case, record) demand, the profitability outlook for the sectors is mixed. For the hog industry, 2015 is shaping up to be a profitable year. With low feed costs and good futures prices, hog producers see profits ahead and expansion is underway. One way to examine the potential profitability of hogs is to calculate the "crush" margin being offered on the various futures markets. The crush margin (patterned after the calculations for soybean crush facilities) in this case is the difference between the revenues implied by lean hog futures and the costs implied by corn and soybean meal futures and feeder pig purchases. Typically, for the Iowa hog industry, crush margins above \$40 per head indicate profitability in the industry. The outlook for 2015 shows strong profitability through the spring and summer.

For cattle, crush margins are based on live cattle futures to estimate revenues and feeder cattle and corn futures to estimate costs. Crush margins above \$150

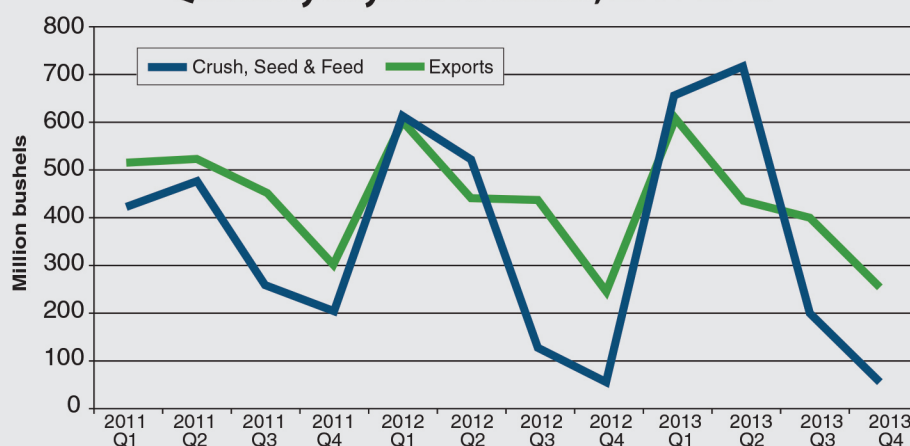
per head indicate profitability in the industry. Crush margins for the fed cattle sector show profitability now, but that erodes quickly in the coming year. Feed costs are projected to remain relatively low over the projection period, but the cost of feeder cattle placements are at record high levels. Currently, the profitability in the cattle industry is not in the feedlots producing the finished animals, it is in the cow-calf operations, producing the animals to fill the feedlots. Over time, that profitability should push forward to the feedlots as the number of feeder animals grows.

Crop margins for 2015 are in negative territory for both corn and soybeans. The cost structure for both crops reflects the great returns crop agriculture has captured over the past few years. Land rents have been bid up. Seed, fertilizer, and chemical costs have increased. Crop production costs tend to follow prices, but there is usually a significant lag of one to two years. That lag generates significant profits in rising markets, but sizable losses in falling ones. ■

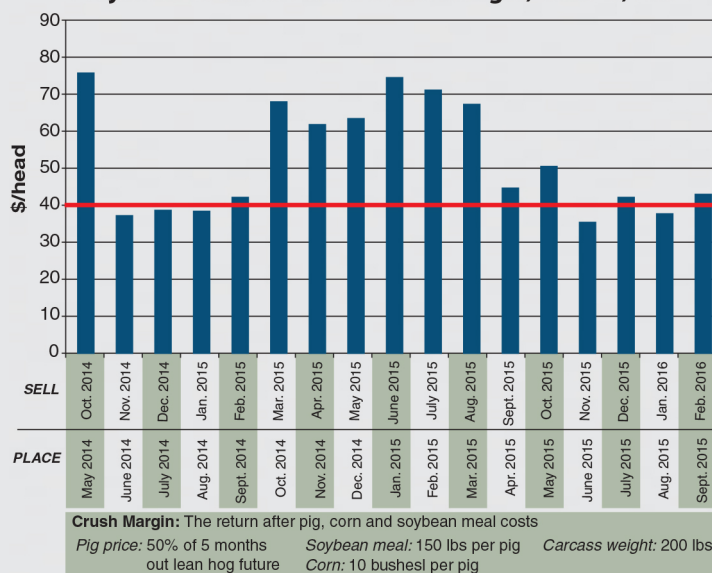
Quarterly Corn Demand, 2011-2013



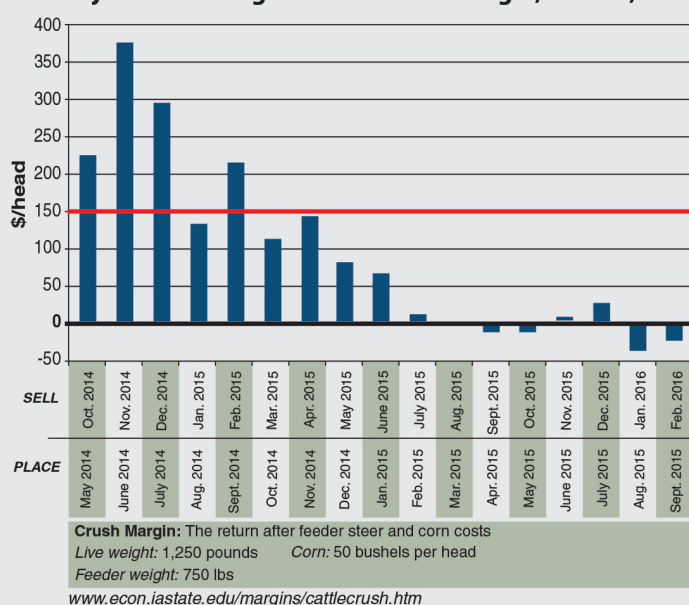
Quarterly Soybean Demand, 2011-2013



Projected Wean to Finish Crush Margin, Oct. 29, 2014



Projected Yearling to Finish Crush Margin, Oct. 29, 2014



for corn and soybeans in Iowa have shared similar overall trends: (a) farm yield buy-up insurance was increasingly replaced by farm revenue buy-up insurance; (b) farm CAT insurance accounted for a significant share of planted area while it was a prerequisite to obtain federal benefits, but declined steadily to account for less than one percent of planted area for both crops since 2011; (c) participation in county plans peaked in 2006 at roughly 7–8 percent of planted area and declined to about one percent of planted area in 2012.

Under the Federal Crop Insurance Act of 1980 (valid until 1994), the federal government offered subsidies covering up to 30 percent of the total premium. However, the effective subsidy rate between 1989 and 1993 averaged 22.6 percent for soybeans and 22.7 percent for corn. The Federal Crop Insurance Reform Act of 1994 increased subsidies significantly and introduced the fully subsidized Catastrophic Risk Protection Endorsement, county plans, and farm revenue buy-up plans. The Agricultural Risk Protection Act (ARPA) of 2000 increased effective subsidies again but the ranking of effective subsidies by broad categories remained unchanged until 2008.

Comparing average effective subsidy rates and insured area across different time periods, the following conclusions emerge:

- Total area under all crop insurance plans for corn and soybeans is responsive to increases in the effective subsidy rate, and it becomes more responsive at higher subsidy levels: an increase of 15.1 percentage points in the average subsidy rate for corn between 1994–99 and 2000–07 is associated with an increase of 6.2 percent in the insured area; but the same percent increase in area is associated with a 6.1 percentage point increase in subsidy rates in the following period.
- Area under farm revenue buy-up plans experienced the highest increases across periods among all insurance categories due at least partly to the fact that their associated effective subsidy rates also increased the most among all insurance categories.
- The increase in subsidy rates for farm yield buy-up plans across periods was insufficient to maintain area under these plans, losing acres to farm revenue buy-up plans.
- Area under county plans is responsive to increases and reductions in effective subsidy rates (and proportionally more responsive to declines than to increases), but participation rates are low.
- Although fully subsidized, participation in farm catastrophic plans has declined considerably through time.

Higher coverage levels

Between 1996 and 1999, farm revenue buy-up plans with a 65 percent coverage level were the most prevalent for corn and soybeans. In 2000, nominal subsidies were increased for all coverage levels, but proportionally more for higher coverage levels. As a result, a coverage level of 75 percent became the most prevalent between 2000 and 2009. In 2008, enterprise unit (the unit division encompassing all the insured acreage in a county) premium subsidies were increased and farm revenue buy-up policies with a coverage level of 80 percent became the most prevalent between 2010 and 2012 for corn, and between 2010 and 2013 for soybeans. Starting in 2013 for corn and 2014 for soybeans, the 85 percent coverage level has become the most prevalent plan among farm revenue buy-up plans.

For additional resources on this topic, please see the online version at www.card.iastate.edu/ag_policy_review/.

References

O'Donoghue, Erik. "The Effects of Premium Subsidies on Demand on Crop Insurance." USDA ERS Report 169. July 2014. ■

Price Expectations and Risk Profiles Drive Commodity Program Choices

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THE OPTIMAL commodity program choice depends as much on the specific production system in each farm as on the producer's expectations about future yields and prices. Furthermore, the risk profile of producers will weigh heavily in the decision. This article illustrates the role of price expectations and risk profiles in commodity program choice using the ISU Farm Bill Analyzer (Excel file available at www.bit.ly/FBAnalyzer).

New Safety Net

The 2014 Farm Bill established two new programs: Price Loss Coverage (PLC) and Agricultural Risk Coverage (ARC). The ARC program is offered at the individual farm level (ARC-IC) and at the county level (ARC-CO).

PLC offers price protection (\$3.70 and \$8.40 per bushel, respectively, for corn and soybeans), while ARC offers shallow-loss revenue protection (based on the most recent five years of marketing year average prices and yields). Payments for PLC and ARC-CO are calculated on 85 percent of base acres of a covered crop in a particular FSA farm number; while payments for ARC-IC are calculated on 65 percent of all base acres enrolled in the program by state.

For each FSA farm number, land owners can choose between enrolling each crop in PLC or ARC-CO and enrolling all program crops on the farm in ARC-IC. For example, a farm can have corn base acres participating in ARC-CO and soybean base acres participating in PLC. However, if ARC-IC is elected for a farm, then all crops in that farm must participate in it, and the farm cannot participate in either of the other two programs. Those crops and/or farms not enrolled in a commodity program by

March 31, 2015 will be automatically enrolled in PLC starting in 2015 and will not participate in PLC or ARC in 2014.

Starting in 2015, a producer who insures his or her crop in a particular FSA farm number with a farm-level COMBO plan and whose crop in that farm is not enrolled in ARC, may choose to buy additional crop insurance at a subsidized rate through the Supplemental Coverage Option (SCO). SCO offers shallow-loss revenue protection at a county level by covering a portion of the producer's crop insurance deductible based on county yields or revenue (depending on the underlying insurance policy held by the producer).

New Choices

In order to participate in the new commodity programs, producers must make three one-time irrevocable choices binding for the life of the Farm Bill: (1) to retain or update payment yields, (2) to maintain or reallocate base acres, and (3) to elect a commodity program for each crop and/or farm. Every year, starting in 2015, producers will have the option

to enroll or not to enroll in an elected program.

The set of information available to producers when making the three irrevocable decisions consists of crop production history (planted acres and yields), base acres, crop insurance records, payment yields, and county average yields. The unknowns that affect both the likelihood of receiving payments and their magnitude in 2014 through 2018 are the trajectory of farm and county yields and national crop prices.

The optimal commodity program choice depends on the specific production system in each farm, on the producer's expectations about future yields and prices, and on his or her risk profile.

The ISU Farm Bill Analyzer (Excel file available at www.bit.ly/FBAnalyzer) provides a set of projections of farm and county yields, based on historical and user-provided data, and three different sets of price forecasts to choose from: USDA, FAPRI, and futures-based. Additionally, the user can choose between three levels of expected price ➡



Table 1. Actual Farm Yields per Planted Acre (bushels per acre)

	Corn	Soybeans
2008	173.1	47.7
2009	173.9	50.1
2010	160.5	50.1
2011	165.2	50.4
2012	147.0	47.6
2013	163.3	45.5

volatility (low, average, and high) that impact both the expected net indemnities from crop insurance and from the new SCO program. Expected payments are calculated over 500 draws from a Monte Carlo simulation of prices and yields for each year.

Consider a 125 acre farm in Boone County with 55.2 corn base acres and 44.8 soybean base acres (after reallocation), and updated PLC payment yields of 147.5 bushels per acre for corn and 44.3 bushels per acre for soybeans. Alfalfa is regularly planted on the farm, but it is not a covered commodity. The yield history is reported in Table 1. Every year between 2014 and 2018, the land owner plans to plant 60 acres to corn and 50 acres to soybeans and will consider buying Revenue Protection at the 85 percent coverage level for corn and at the 80 percent coverage level for soybeans.

Price Expectations

If the producer's price expectations align with USDA price projections (Table 2), then the combination of programs that maximizes the net present value of expected payments is PLC and SCO for corn and ARC-CO for soybeans (Figure 1). This

combination of programs would result in an expected net present value of \$33,535 in program payments and net indemnities from Revenue Protection and SCO.

If the producer's price expectations are more in line with the futures prices from October 31, 2014 instead, then the combination of programs that maximizes the net present value of expected payments is ARC-CO for both crops and Revenue Protection only for corn (Figure 2).

Risk Profile

If the producer is concerned about his or her safety net in years of very low yields or very low prices, then his or her goal might not be to maximize expected payments over the entire range of possible revenues per year, but to maximize expected payments over the bottom 10 percent of possible revenues. In these cases, the producer is truly looking at the flow of payments during loss years.

If the producer expects the futures prices from October 31, 2014 to hold, then the combination of programs that maximize the net present value of expected payments in a low crop revenue scenario is PLC, Revenue Protection, and SCO for corn and ARC-CO and Revenue Protection for soybeans (Figure 3).

These last two examples highlight how risk preferences can influence the Farm Bill program choice. Given the same expected prices and yields, producers may reach different choices. The program that offers the highest expected payment may not be the program that minimizes the largest expected loss. ■

Table 2. Projected Marketing Year Average Prices for Corn and Soybeans (\$ per bushel)

	USDA (Oct. 10, 2014)		Futures Contrats (Oct. 31, 2014)	
	Corn	Soybeans	Corn	Soybeans
2014	\$3.40	\$10.00	\$3.92	\$10.55
2015	\$3.00	\$8.85	\$4.25	\$10.40
2016	\$3.35	\$8.90	\$4.30	\$10.11
2017	\$3.45	\$9.05	\$4.21	\$9.96
2018	\$3.60	\$9.25	\$4.34	\$10.19

Expected payments and net indemnities. . .

Figure 1. . . under USDA price projections

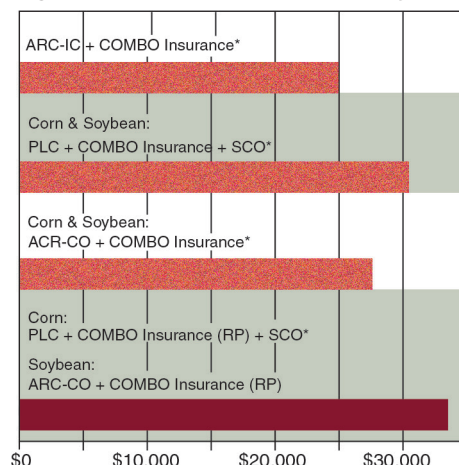


Figure 2. . . using futures prices as of Oct. 31, 2014

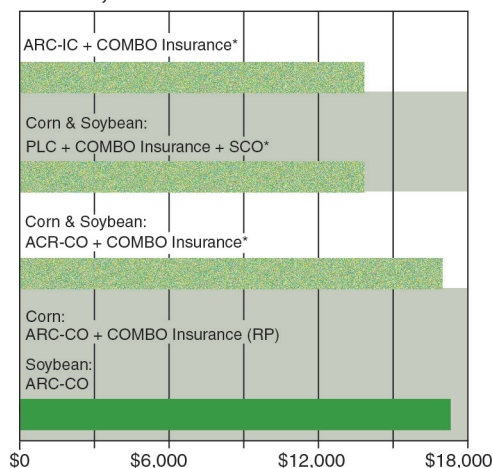
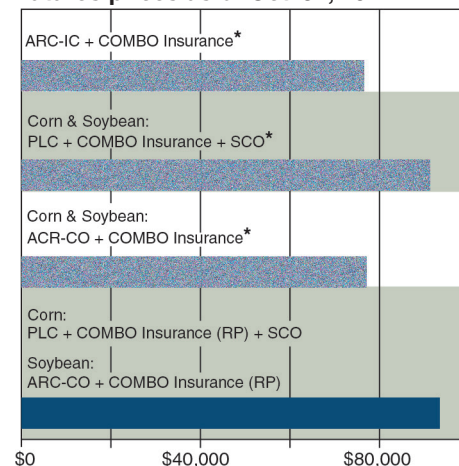


Figure 3. . . during loss years using futures prices as of Oct. 31, 2014



*Corn: RP 0.85, Soy: RP 0.8

ARC = Agricultural Risk Coverage
 ARC-IC = ARC at the individual farm level
 ARC-CO = ARC at the county level
 RP = Revenue Protection
 PLC = Price Loss Coverage
 SCO = Supplemental Coverage Option
 COMBO = existing policies (starting in 2011) combined into one
 FSA = Farm Service Agency (USDA)

A background image featuring a financial chart with multiple lines and a bar chart at the bottom. A hand holding a pen is pointing at the chart. The chart includes various data points and percentages.

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